

IN THE CLAIMS:

Please amend claims 1-4, 7, and 11-24 as follows.

1. (Currently Amended) A method of determining a recording velocity of a signal by a write laser beam onto an optical disc, the method comprising the steps of:

undergoing a test recording of a signal onto a predetermined area of the optical disc prior to an actual recording at one or more levels of the recording velocity;

reproducing the signal by a read laser beam from the predetermined area of the optical disc;

generating a first characteristic ~~[[in]]~~ as a function of the recording velocity based on the reproduced signal, the first characteristic representing a relation between an optical feature of the laser beam and a qualitative parameter of a recording state of the signal, the optical feature being expressed in terms of either a  $\beta$  value obtained from the read laser beam reflected back from the optical disc or a power of the writing laser beam;

generating a second characteristic from the first characteristic based on a predetermined preferable range of the qualitative parameter, such that the second characteristic represents a relation between the recording velocity and an available range of the optical feature corresponding to the predetermined preferable range of the qualitative parameter of the recording state; and

determining a preferable value of the recording velocity according to the second characteristic and a predetermined preferable range of the optical feature which is predetermined to obtain ~~[[the]]~~ a preferable recording state.

2. (Currently Amended) The method according to claim 1, further comprising ~~the steps of~~ storing a plurality of preferable ranges of the qualitative parameter and a plurality of preferable ranges of the optical feature in correspondence with a plurality of types of optical discs, and detecting the type of the optical disc under the test recording, such that ~~the step of~~ generating the second characteristic uses the optical range of the qualitative parameter corresponding to the detected type of the optical disc, and ~~the step of~~ determining the preferable value of the recording velocity uses the preferable range of the optical feature corresponding to the detected type of the optical disc.

3. (Currently Amended) The method according to claim 1, wherein ~~the step of~~ generating the first characteristic adopts the qualitative parameter selected from the group consisting of a frequency of detecting a frame synchronization signal contained in the signal reproduced from the optical disc, a CI error contained in the reproduced signal, a jitter of the reproduced signal, a deviation of the reproduced signal, a degree of modulation applied to the laser beam, a reflectance of the laser beam from the optical disc and an amplitude of the reproduced signal.

4. (Currently Amended) An apparatus for recording a signal onto an optical disc by a write laser beam at a ~~certain~~ recording velocity, the apparatus comprising:

a test recording section that undergoes a test recording of a signal onto a predetermined area of the optical disc prior to an actual recording at one or more levels of the recording velocity;

a reproducing section that reproduces the signal by a read laser beam from the predetermined area of the optical disc;

a first generating section that generates a first characteristic ~~[[in]]~~ as a function of the recording velocity based on the reproduced signal, the first characteristic representing a relation between an optical feature of the laser beam and a qualitative parameter of a recording state of the signal, the optical feature being expressed in terms of either a  $\beta$  value obtained from the read laser beam reflected back from the optical disc or a power of the writing laser beam;

a second generating section that generates a second characteristic from the first characteristic based on a predetermined preferable range of the qualitative parameter, such that the second characteristic represents a relation between the recording velocity and an available range of the optical feature corresponding to the predetermined preferable range of the qualitative parameter of the recording state; and

a determining section that determines a preferable value of the recording velocity according to the second characteristic and a predetermined preferable range of the optical feature which is predetermined to obtain ~~[[the]]~~ a preferable recording state.

5. (Original) The apparatus according to claim 5, further comprising:

a storing section that stores a plurality of preferable ranges of the qualitative parameter and a plurality of preferable ranges of the optical feature in correspondence with a plurality of types of optical discs; and

a detecting section that detects the type of the optical disc under the test recording, such that the second generating section uses the optical range of the qualitative parameter corresponding to the detected type of the optical disc, and the determining section uses the preferable range of the optical feature corresponding to the detected type of the optical disc.

6. (Original) The apparatus according to claim 4, wherein the first generating section adopts the qualitative parameter selected from the group consisting of a frequency of detecting a frame synchronization signal contained in the signal reproduced from the optical disc, a C1 error contained in the reproduced signal, a jitter of the reproduced signal, a deviation of the reproduced signal, a degree of modulation applied to the laser beam, a reflectance of the laser beam from the optical disc and an amplitude of the reproduced signal.
7. (Currently Amended) The apparatus according to claim 4, further comprising:  
a setting section that is operated by a user for setting a desired recording velocity; and  
a judging section that judges whether the actual recording of the signal onto the optical disc at the desired recording velocity is possible ~~or not~~ according to the determined preferable value of the recording velocity.
8. (Original) The apparatus according to claim 7, further comprising an adjusting section operative when the judging section judges that the actual recording is not possible since the desired recording velocity exceeds the preferable recording velocity, for shifting the desired recording velocity below the preferable recording velocity so as to enable the recording of the signal.
9. (Original) The apparatus according to claim 8, further comprising a predicting section that predicts a time necessary for the recording at the shifted recording velocity, and an indicating section that indicates the predicted time to the user.
10. (Original) The apparatus according to claim 4, further comprising:  
a driving section that operates in the recording of the signal for selectively driving

the optical disc in either of a CLV mode where the optical disc is rotated at a constant linear velocity or a CAV mode where the optical disc is rotated at a constant angular velocity; and

a control section that controls the driving section to switch between the CLV mode and the CAV mode according to the determined preferable recording velocity.

11. (Currently Amended) A computer program for use in a disc apparatus having a processor for recording a signal onto an optical disc by a write laser beam at a preferable recording velocity, the computer program being executed by the processor for enabling the disc apparatus to perform a process comprising ~~the steps of:~~

undergoing a test recording of a signal onto a predetermined area of the optical disc prior to an actual recording at one or more levels of the recording velocity;

reproducing the signal by a read laser beam from the predetermined area of the optical disc;

generating a first characteristic ~~[[in]]~~ as a function of the recording velocity based on the reproduced signal, the first characteristic representing a relation between an optical feature of the laser beam and a qualitative parameter of a recording state of the signal, the optical feature being expressed in terms of either a  $\beta$  value obtained from the read laser beam reflected back from the optical disc or a power of the writing laser beam;

generating a second characteristic from the first characteristic based on a predetermined preferable range of the qualitative parameter, such that the second characteristic represents a relation between the recording velocity and an available range of the optical feature corresponding to the predetermined preferable range of the

qualitative parameter of the recording state; and

determining a preferable value of the recording velocity according to the second characteristic and a predetermined preferable range of the optical feature which is predetermined to obtain ~~[[the]]~~ a preferable recording state.

12. (Currently Amended) A method of determining a power of a writing optical beam used for recording of a signal onto an optical disc, the method comprising ~~the steps of:~~

undergoing a test recording of a signal onto a predetermined ~~test~~ test area of the optical disc prior to an actual recording;

reproducing the signal from the predetermined test area of the optical disc;

generating a first recording characteristic according to the reproduced signal, representing a relation between ~~[[ $\Delta$ ]]~~ a  $\beta$  value and the power of the writing optical beam, ~~the  $\Delta\beta$  indicating a variation of  $\beta$  value per a unit amount of the power of the writing optical beam,~~ the  $\beta$  value being derived from a variation of an amplitude of the reproduced signal; ~~and~~

obtaining from the first recording characteristic a second recording characteristic representing a relation between a  $\Delta\beta$  and the power of the writing optical beam, the  $\Delta\beta$  indicating a variation of the  $\beta$  value per a unit amount of the power of the writing optical beam;

determining a recording power range according to the obtained second recording characteristic using a preferable range of  $\Delta\beta$ , which is predetermined for realizing a preferable recording, such that the power of the writing optical beam is determined within the recording power range; and

determining a preferable power of the writing optical beam according to the generated first recording characteristic ~~with using a preferable range of  $\Delta\beta$ , which is predetermined for realizing a preferable recording within the recording power range.~~

13. (Currently Amended) A method of determining a power of a writing optical beam used for recording of a signal onto an optical disc, the method comprising ~~the steps of:~~

undergoing a test recording of a signal onto a predetermined ~~[[teal]]~~ test area of the optical disc prior to an actual recording;

reproducing the signal from the predetermined test area of the optical disc;

generating a recording characteristic according to the reproduced signal, representing a relation between the power of the writing optical beam and at least one of a plurality of qualitative parameters being associated ~~[[to]]~~ with a quality of the recording and being selected from a group consisting of a frequency of detecting a frame synchronization signal contained in the signal reproduced from the optical disc, a C1 error contained in the reproduced signal, a fitter of the reproduced signal, a deviation of the reproduced signal, a degree of modulation applied to the laser beam, a reflectance of the laser beam from the optical disc and an amplitude of the reproduced signal; and

determining a preferable power of the writing optical beam for use in the actual recording according to the generated recording characteristic.

14. (Currently Amended) A method of determining a power of a writing optical beam used for recording of a signal onto an optical disc, the method comprising ~~the steps of:~~

undergoing a test recording of a signal onto a predetermined ~~[[teal]]~~ test area of the optical disc prior to an actual recording;

reproducing the signal from the predetermined test area of the optical disc;  
 generating one recording characteristic according to the reproduced signal,  
 representing a relation between the power of the writing optical beam and one of a plurality of qualitative parameters being associated ~~[[to]]~~ with a quality of the recording  
 and being selected from a group consisting of a  $\beta$  value derived from a variation of an  
 amplitude of the reproduced signal, a frequency of detecting a frame synchronization  
 signal contained in the signal reproduced from the optical disc, a C1 error contained in  
 the reproduced signal, a fitter of the reproduced signal, a deviation of the reproduced  
 signal, a degree of modulation applied to the laser beam, a reflectance of the laser  
 beam from the optical disc and an amplitude of the reproduced signal;

generating another recording characteristic according to the reproduced signal,  
 representing a relation between the power of the writing optical beam and another of  
 the qualitative parameters; and

determining a preferable power of the writing optical beam for use in the actual  
 recording according to the generated recording characteristics.

15. (Currently Amended) The method according to claim 14, wherein ~~the step of~~  
 generating comprises generating at least the recording characteristic representing the  
 relation between the power of the optical beam and the  $\beta$  value.

16. (Currently Amended) The method according to claim 15, wherein ~~the step of~~  
 determining comprises determining a preferable level of the power according to first  
 recording characteristic representing the relation between the power and the  $\beta$  value,  
 determining a preferable range of the power according to second recording  
 characteristic representing the relation between the power and a qualitative parameter



other than the  $\beta$  value, and determining whether the determined level is included in the determined range.

17. (Currently Amended) The method according to claim 14, wherein ~~the step of~~ reproducing comprises reproducing the signal at a reading rate which is set smaller than a writing rate of the signal at the test recording.

18. (Currently Amended) The method according to claim 14, wherein ~~the step of~~ reproducing comprises reproducing a plurality of the signals by undergoing a plurality of reproducing sessions on the test area.

19. (Currently Amended) An apparatus for recording a signal onto an optical disc by a writing optical beam having a preferable power, the apparatus comprising:

a test recording section that undergoes a test recording of a signal onto a predetermined test area of the optical disc prior to an actual recording;

a reproducing section that reproduces the signal from the predetermined test area of the optical disc;

a generating section that generates a first recording characteristic according to the reproduced signal  $[[,]]$  representing a relation between  $[[\Delta]]$  a  $\beta$  value and the power of the writing optical beam, ~~the  $\Delta\beta$  indicating a variation of  $\beta$  value per a unit amount of the power of the writing optical beam,~~ the  $\beta$  value being derived from a variation of an amplitude of the reproduced signal; the generating section further generates from the first recording characteristic a second recording characteristic representing a relation between a  $\Delta\beta$  and the power of the writing optical beam, the  $\Delta\beta$  indicating a variation of the  $\beta$  value per a unit amount of the power of the writing optical beam; and

a determining section that determines a recording power range according to the second recording characteristic using a preferable range of  $\Delta\beta$ , which is predetermined for realizing a preferable recording, such that the power of the writing optical beam is determined within the recording power range, and that further determines a preferable power of the writing optical beam according to the ~~generated~~ first recording characteristic ~~with using a preferable range of  $\Delta\beta$ , which is predetermined for realizing a preferable recording within the recording power range.~~

20. (Currently Amended) An apparatus for recording a signal onto an optical disc by a writing optical beam having a preferable power, the apparatus comprising:

a test recording section that undergoes a test recording of a signal onto a predetermined test area of the optical disc prior to an actual recording;

a reproducing section that reproduces the signal from the predetermined test area of the optical disc;

a generating section that generates a recording characteristic according to the reproduced signal, representing a relation between the power of the writing optical beam and at least one of a plurality of qualitative parameters being associated ~~[[to]]~~ with a quality of the recording and being selected from a group consisting of a frequency of detecting a frame synchronization signal contained in the signal reproduced from the optical disc, a CI error contained in the reproduced signal, a fitter of the reproduced signal, a deviation of the reproduced signal, a degree of modulation applied to the laser beam, a reflectance of the laser beam from the optical disc and an amplitude of the reproduced signal; and

a determining section that determines a preferable power of the writing optical beam for use in the actual recording according to the generated recording characteristic.

21. (Currently Amended) An apparatus for recording a signal onto an optical disc by a writing optical beam having a preferable power, the apparatus comprising:

a test recording section that undergoes a test recording of a signal onto a predetermined test area of the optical disc prior to an actual recording;

a reproducing section that reproduces the signal from the predetermined test area of the optical disc;

a generating section that generates one recording characteristic according to the reproduced signal, representing a relation between the power of the writing optical beam and one of a plurality of qualitative parameters being associated ~~[[to]]~~ with a quality of the recording and being selected from a group consisting of a  $\beta$  value derived from a variation of an amplitude of the reproduced signal, a frequency of detecting a frame synchronization signal contained in the signal reproduced from the optical disc, a C1 error contained in the reproduced signal, a jitter of the reproduced signal, a deviation of the reproduced signal, a degree of modulation applied to the laser beam, a reflectance of the laser beam from the optical disc and an amplitude of the reproduced signal;

another generating section that generates another recording characteristic according to the reproduced signal, representing a relation between the power of the writing optical beam and another of the qualitative parameters; and

a determining section that determines a preferable power of the writing optical beam for use in the actual recording according to the generated recording characteristics.

22. (Currently Amended) A computer program for use in a disc apparatus having a processor for recording a signal onto an optical disc by a writing optical beam having a preferable power, the computer program being executable by the processor for enabling the disc apparatus to perform a process comprising ~~the steps of:~~

undergoing a test recording of a signal onto a predetermined ~~test~~ test area of the optical disc prior to an actual recording;

reproducing the signal from the predetermined test area of the optical disc;

generating a first recording characteristic according to the reproduced signal, representing a relation between  $[\Delta]$  a  $\beta$  value and the power of the writing optical beam, ~~the  $\Delta\beta$  indicating a variation of  $\beta$  value per a unit amount of the power of the writing optical beam,~~ the  $\beta$  value being derived from a variation of an amplitude of the reproduced signal; ~~and~~

obtaining from the first recording characteristic a second recording characteristic representing a relation between  $\Delta\beta$  and the power of the writing optical beam, the  $\Delta\beta$  indicating a variation of the  $\beta$  value per a unit amount of the power of the writing optical beam;

determining a recording power range according to the obtained second recording characteristic using a preferable range of  $\Delta\beta$ , which is predetermined for realizing a preferable recording, such that the power of the writing optical beam is determined within the recording power range; and

determining a preferable power of the writing optical beam according to the generated first recording characteristic ~~with using a preferable range of  $\Delta\beta$ , which is predetermined for realizing a preferable recording within the recording power range.~~

23. (Currently Amended) A computer program for use in a disc apparatus having a processor for recording a signal onto an optical disc by a writing optical beam having a preferable power, the computer program being executable by the processor for enabling the disc apparatus to perform a process comprising ~~the steps of:~~

undergoing a test recording of a signal onto a predetermined ~~[[teal]]~~ test area of the optical disc prior to an actual recording;

reproducing the signal from the predetermined test area of the optical disc;

generating a recording characteristic according to the reproduced signal, representing a relation between the power of the writing optical beam and at least one of a plurality of qualitative parameters being associated ~~[[to]]~~ with a quality of the recording and being selected from a group consisting of a frequency of detecting a frame synchronization signal contained in the signal reproduced from the optical disc, a C1 error contained in the reproduced signal, a jitter of the reproduced signal, a deviation of the reproduced signal, a degree of modulation applied to the laser beam, a reflectance of the laser beam from the optical disc and an amplitude of the reproduced signal; and

determining a preferable power of the writing optical beam for use in the actual recording according to the generated recording characteristic.

24. (Currently Amended) A computer program for use in a disc apparatus having a processor for recording a signal onto an optical disc by a writing optical beam having a

preferable power, the computer program being executable by the processor for enabling the disc apparatus to perform a process comprising ~~the steps of~~:

undergoing a test recording of a signal onto a predetermined ~~[[teal]]~~ test area of the optical disc prior to an actual recording;

reproducing the signal from the predetermined test area of the optical disc;

generating one recording characteristic according to the reproduced signal, representing a relation between the power of the writing optical beam and one of a plurality of qualitative parameters being associated ~~[[to]]~~ with a quality of the recording and being selected from a group consisting of a  $\Delta\beta$  value derived from a variation of an amplitude of the reproduced signal, a frequency of detecting a frame synchronization signal contained in the signal reproduced from the optical disc, a CI error contained in the reproduced signal, a fitter of the reproduced signal, a deviation of the reproduced signal, a degree of modulation applied to the laser beam, a reflectance of the laser beam from the optical disc and an amplitude of the reproduced signal;

generating another recording characteristic according to the reproduced signal, representing a relation between the power of the writing optical beam and another of the qualitative parameters; and

determining a preferable power of the writing optical beam for use in the actual recording according to the generated recording characteristics.